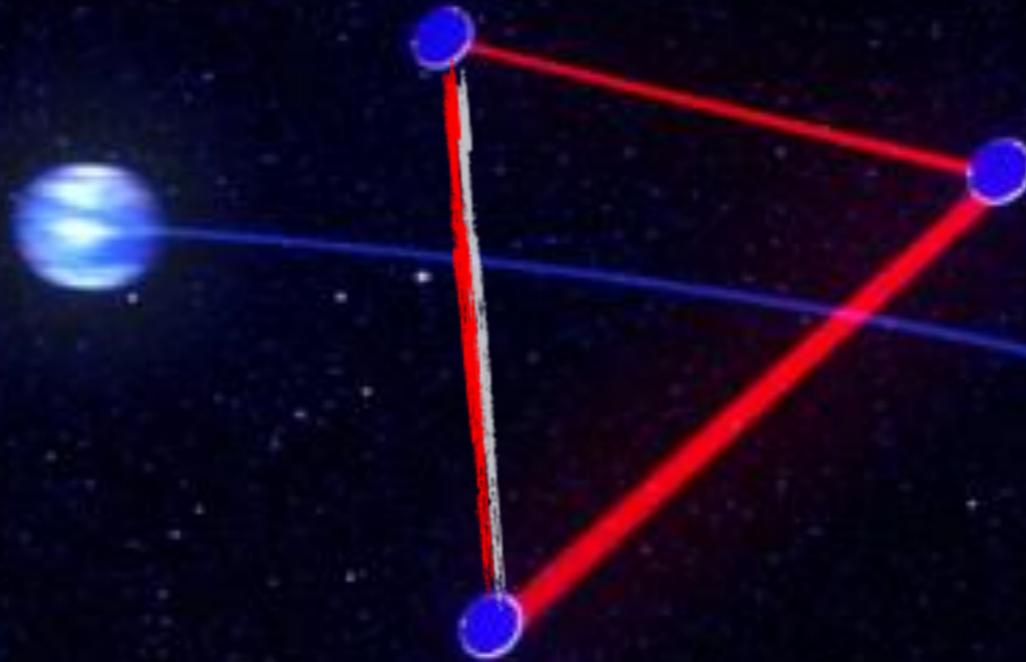


# LISA in the light of eLISA



Neil Cornish for GWSAG  
APS Meeting

Denver 2013

# Next Opportunities for large GW mission

- L2 Call In Europe
  - Large mission call for ESA-led mission
    - e(volving) LISA is one major candidate
  - L2 Launch scheduled for 2028 (L3: 2034)
  - Potential international partner
- Next Decadal in US
  - Launch 2028-2030

# L2/L3 Call in Europe

- L2/L3 Call In Europe

## EXECUTIVE SUMMARY

The Director of Science and Robotic Exploration intends to define, in the course of 2013, the science themes and questions that will be addressed by the “L2” and “L3” missions. These are the two Large missions in the Cosmic Vision plan currently planned for a launch in 2028 and 2034, following the already selected L1 mission JUICE, to be launched in 2022. This process will start with a consultation of the broad scientific community, in the form of a “Call for White Papers”, solicited through the present document. By means of the White Papers, the scientific community is invited to submit proposals for science themes and associated questions that should be addressed by the L2 and L3 missions.

White Papers can also explicitly advocate observatory-type missions and survey-type missions. Observatories and survey-type missions have figured in the Science Programme’s line-up of large missions, and the scientific community is also invited to advocate if and which such missions should be considered for the L2 and L3 opportunities.

# L2/L3 Call in Europe

- L2/L3 Call In Europe:
  - Cost: About twice ESA's annual science budget: €1000M (ESA alone)
  - + typically €250M from ESA member states (payload)
  - Compare: ESA approved costing for L1-eLISA: €1268M ~ €1250M
  - ESA can do it alone!! But what about partners??

Large missions represent the “flagships” of European science and should therefore be European-led (with Europe being responsible for upward of approximately 80% of the mission's elements). While limited international participation is possible and welcome, L missions should not rely on international cooperation for mission-enabling elements, as Europe's capability to implement the mission should be safeguarded. Historically, the cost to ESA of L missions (or cornerstone) has

- Rules for partners:
  - ~20% of mission cost: €250M ~ \$330M (M-class or small Probe at NASA)
  - Europe has to have the capability to provide all critical technologies
    - That means everything in a LISA-like mission

# eLISA Consortium

- Prepare White Paper (20 pages total)
  - Single WP for eLISA
    - Survey mission with broad science theme: The gravitational Universe
      - Covers multiple smaller science themes
    - Strawman mission design: 2 Arm eLISA design
      - ESA only
      - Potential International Contributions for cost/risk mitigation and/or performance improvement
- Current Schedule:
  - Deadline for WP: May 24th, 2013
  - Invitation to spokesperson for workshop: July 8th, 2013
  - Open workshop: September 2-3, 2013 (TBC)
  - Director's proposal to SPC: Late October 2013
  - Selection of science themes for L2 and L3: November 13-14, 2013

# Beyond 2013:

- Roadmap for LISA (Expected by eLISA Consortium)
  - Preselection of LISA for L2 in November 2013
  - Call for L2 Mission mid 2014
  - Assessment study during 2015 (Had several before)
  - Also 2015: **LISA Pathfinder** launch!!
  - Selection of L2 scheduled for February 2016 SPC meeting
  - Launch 2028



# Critical Milestones for US:

## 2016: Selection of L2

- Do we have to have 'signed' agreements between NASA and ESA prior to the SPC meeting?
- What would be the US contributions?

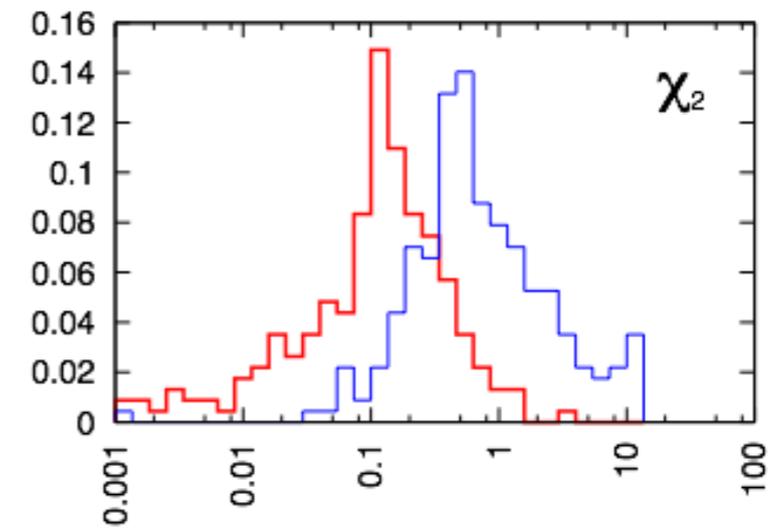
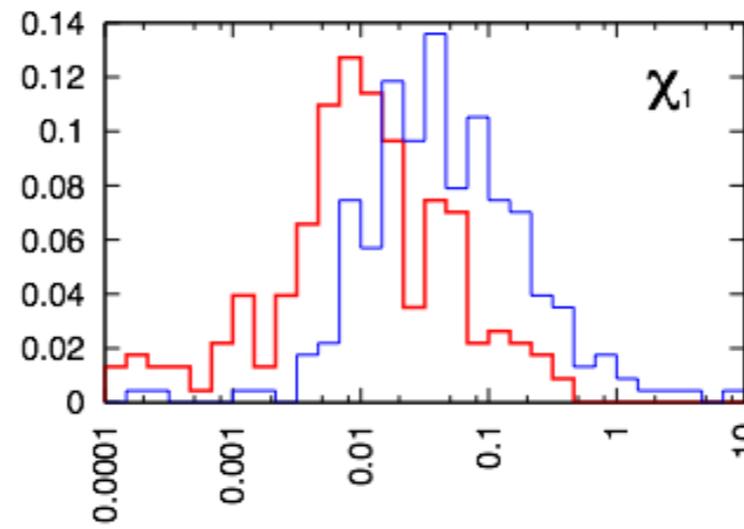
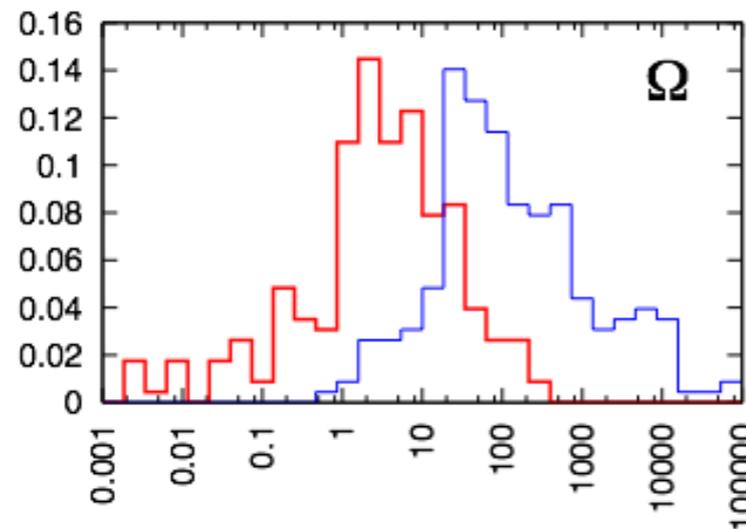
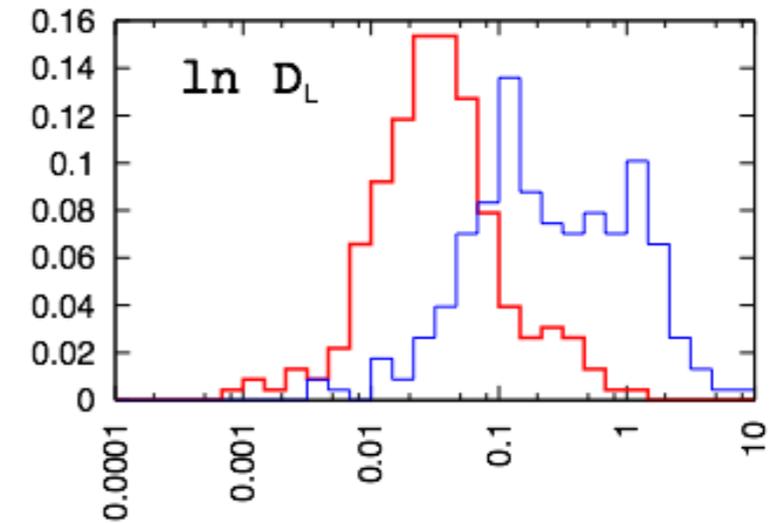
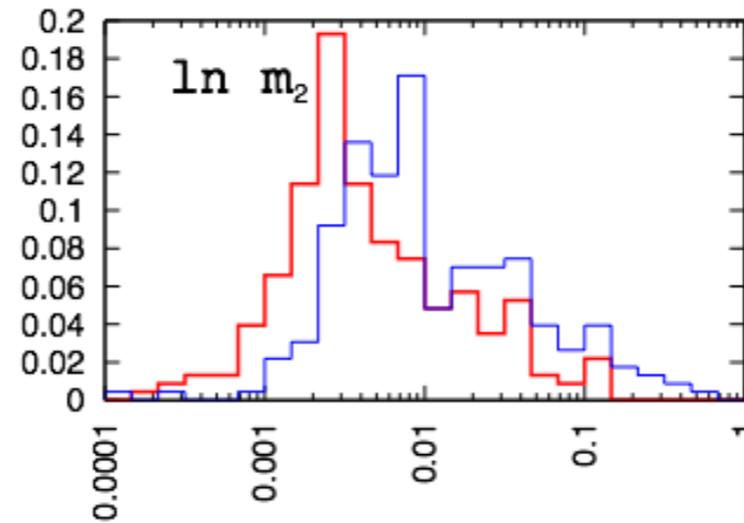
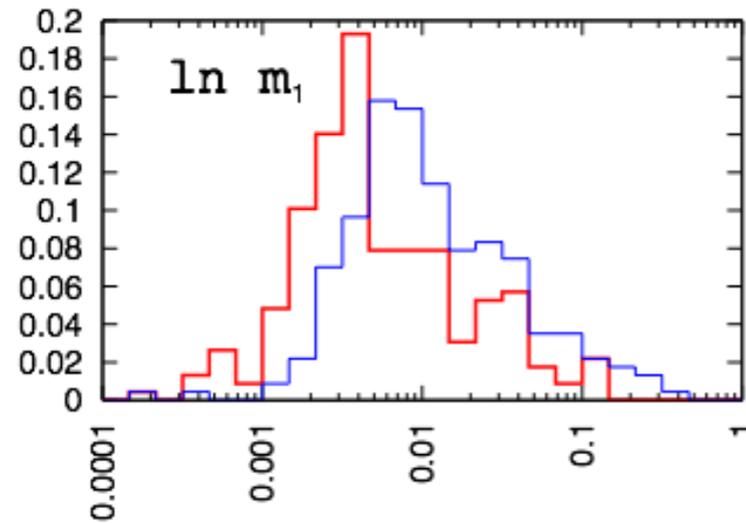
## 2016-2020: Plans for an ESA Engineering Qualification Model

- Do we need to participate with our technologies?
- At what Technical Readiness Level? (Nominal: TRL5)

Good will at ESA and NASA to collaborate on eLISA.

Paul Hertz: 'If ESA selects a decadal science theme for L2, we will participate.' (January AAS meeting 2013, close to his exact words.)

# Benefit of US Contribution to eLISA



eLISA-pol  
(with US)

eLISA  
(without US)

# Next Opportunities

- L2 Call In Europe
  - Large mission call for ESA-led mission
    - e(volving) LISA is one major candidate
  - Launch scheduled for 2028
  - Potential international partner
- Next Decadal
  - No large mission opportunity prior to 2020 in US
  - Launch 2028-2030

Hopefully not necessary  
But we started looking at this as well